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Arabidopsis thaliana FAE1 (SEQ ID NO:2)

MTSVNVKLLY RYVLTNFFNL CFFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSVSKVMD
IFYQIRKADT SSRNVACDDP SSLDFLRKIQ ERSLGLDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFENTKVNP REIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNIKSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITQGIYAG ENRSMMVSNC LFRVGGAAIL LSNKSGDRRR SKYKLVHTVR
THTGADDKSF RCVQQEDDES GKIGVCLSKD ITNVAGTTLT KNIATLGPLI
LPLSEKFLFF ATFVAKKLLK DKIKHYYVPD FKLAVIDHFCI HAGGRAVIDE
LEKNLGLSPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKGNKAW
QIALGSGFKC NSAVWVALRN VKASANSPWQ HCIDRYPVKI DSDLSSKTH
VQNGRS

Brassica napus elongase KCS (SEQ ID NO:4)

MTSINVKLLY HYVITNLFNL CFFPLTAIVA GKAYRLTIDD LHHLYYSYLQ
HNLITIAPLF AFTVFGSVLY IATRPKPVYL VEYSCYLPPPT HCRSSISKVM
DIFYQVRKAD PSRNGTCDDS SWLDFLRKIQ ERSLGLDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMVSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKGNKVV
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VQNGRS

B. napus elongase KCS (SEQ ID NO:6)

MTSINVKLLY HYVITNLFNL CFFPLTAIVA GKAYLTIDDL HHLYYSYLQH
NLITIAPLLA FTVFGSVLYI ATRPKPVYL EYSCYLPPTH CRSSISKVMD
IFFQVRKADP SRNGTCDDSS WLDFLRKIQE RSGLGDETHG PEGLLQVPPR
KT FARAREET EQVIIGALEN LFKNTNVNPK DIGILVVNSS MFNPTPSLSA
MVVNTFKLRS NVRSFNLLGGM GCSAGVIAID LAKDLLHVHK NTYALVVSTE
NITYNIYAGD NRSMMSVNCL FRVGGAAILL SNKPRDRRRS KYELVHTVRT
HTGADDKSFR CVQQGDDENG QTGVSLSKDI TDVAGRTVKK NIATLGPLIL
PLSEKLLFFV TFMGKKLFKD EIKHYYVPDF KLAIDHFCIH AGGKAVIDVL
EKNLGLAPID VEASRSTLHR FGNTSSSIW YELAYIEPKG RMKGNKVVQ
IALGSGFKCN SAVWVALNNV KASTNSPWEH CIDRYPVKID SDSGKSETRV
PNGRS.

At114 (SEQ ID NO:8)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSISKVMD
IFYQIRKADT SSRNGTCDDSS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVNW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VPNGRS

At74 (SEQ ID NO:10)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPKPVYLV EYSCYLPPTH CRSSISKVMD
IFYQVRKADP SRNGTCDDSS WLDFLRKIQE RSGLGDETHG PEGLLQVPPR
KTFAAAREET EQVIIGALEN LFKNTNVNPK DIGILVVNSS MFNPTPSLSA
MVVNTFKLRS NVRSFNLGGM GCSAGVIAID LAKDLLHVHK NTYALVVSTE
NITYNIYAGD NRSMMSNCL FRVGGAAILL SNKPGDRRRS KYELVHTVRT
HTGADGKSFR CVQQGDDENG KIGVSLSKDI TDVAGRTVKK NIATLGPLIL
PLSEKLLFFV TFMGKKLFKD KIKHYYVPDF KLAIDHFCIH AGGRAVIDVL
EKNLALAPID VEASRSTLHR FGNTSSSIW YELAYIEAKG RMKKGNVWQ
IALGSGFKCN SAVWVALNNV KASTNSPWEH CIDRYPVKID SDSGKSETRV
QNGRS

At114 L91C K92R (SEQ ID NO:12)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH CRVSISKVMD
IFYQIRKADT SSRNGTCDNS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVNW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VPNGRS

FIGURE 1-2

At114 K92R (SEQ ID NO:14)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH LRVSVSKVMD
IFYQIRKADT SSRNGTCDDSS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMVSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLKF DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNNTSSSI WYELAYIEAK GRMKKGKVNW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VPNGRS

At114 G307D. (SEQ ID NO:16)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSVSKVMD
IFYQIRKADT SSRNGTCDDSS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMVSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLKF DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNNTSSSI WYELAYIEAK GRMKKGKVNW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VQNGRS

At74 G306D (SEQ ID NO:18)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLFA FTVFGLVLYI VTRPKPVYLV EYSCYLPPH CRSSISKVMD
IFYQVRKADP SRNGTCDDSS WLDFLRKIQE RSGLGDETHG PEGLLQVPPR
KTFAAAREET EQVIIGALEN LFKNTNVNPK DIGILVVNSS MFNPTPSLSA
MVVNTFKLRS NVRSFNLGGM GCSAGVIAID LAKDLLHVHK NTYALVVSTE
NITYNIYAGD NRSMMVSNC FRVGGAAILL SNKPGDRRRS KYELVHTVRT
HTGADDKSFR CVQQGDDENG KIGVSLSKDI TDVAGRTVKK NIATLGPLIL
PLSEKLLFFV TFMGKKLKF D KIKHYYVPDF KLAIDHFCIH AGGRAVIDVL
EKNLALAPID VEASRSTLHR FGNTSSSIW YELAYIEAKG RMKKGNKVNQ
IALGSGFKCN SAVWVALNNV KASTNSPWEH CIDRYPVKID SDSGKSETRV
QNGRS

At114 L91C K92R G307D (SEQ ID NO:20)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPNPVYLV DYSYCLPPPH CRVSISKVMD
IFYQIRKADT SSRNGTCDS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVN
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKA DSDSGKSETR
VQNGRS

At114 K92R G307D (SEQ ID NO:22)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPNPVYLV DYSYCLPPPH LRVSVSKVMD
IFYQIRKADT SSRNGTCDD SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVN
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKA DSDSGKSETR
VQNGRS

At254 (SEQ ID NO:24)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNLLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPNPVYLV DYSYCLPPPH LKVSVSKVMD
IFYQIRKADT SSRNVACDDP SSLDFLRKIQ ERSGLGDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFENTKVNP REIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNIKSFNLLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVN
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKA DSDSGKSETR
VPNGRS

FIGURE 1-4

At173 (SEQ ID NO:26)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSISKVMD
IFYQIRKADT SSRNVACDDP SSLDFLRKIQ ERSGLGDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVVW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VQNGRS

Bn176 (SEQ ID NO:28)

MTSINVKLLY HYVITNLFNL CFFPLTAIVA GKAYRLTIDD LHHLYYSYLO
HNLITIAPLF AFTVFGSVLY IATRPKPVYL VEYSCYLPTT HCRSSISKVM
DIFYQVRKAD PSRNGTCDDS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTKVNP REIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNIKSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITQGIYAG ENRSMMSNC LFRVGGAAIL LSNKSGDRRR SKYKLVHTVR
THTGADDKSF RCVQQEDDES GKIGVCLSKD ITNVAGTTLT KNIATLGPLI
LPLSEKFLFF ATFVAKKLLK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDE
LEKNLGLSPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKAW
QIALGSGFKC NSAVWVALRN VKASANSPWQ HCIDRYPVKI DSDLSKSPTH
VQNGRS

At399 (SEQ ID NO:30)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSISKVMD
IFYQIRKADT SSRNVACDDP SSLDFLRKIQ ERSGLGDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFENTKVNP REIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNIKSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITQGIYAG ENRSMMSNC LFRVGGAAIL LSNKSGDRRR SKYKLVHTVR
THTGADDKSF RCVQQEDDES GKIGVCLSKD ITNVAGTTLT KNIATLGPLI
LPLSEKFLFF ATFVAKKLLK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVVW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VQNGRS

FIGURE 1-5

Bn399 (SEQ ID NO:32)

MTSINVKLLY HYVITNLFNL CFFPLTAIVA GKAYRLTIDD LHHLYYSYLQ
HNLITIAPLF AFTVFGSVLY IATRPKPVYL VEYSCYLPPT HCRSSISKVM
DIFYQVRKAD PSRNGTCDDS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMVSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADGKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDE
LEKNLGLSPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKAW
QIALGSGFKC NSAVWVALRN VKASANSPWQ HCIDRYPVKI DS
DLSKS
KTH VQNGRS

Bn G307D (SEQ ID NO:34)

MTSINVKLLY HYVITNLFNL CFFPLTAIVA GKAYRLTIDD LHHLYYSYLQ
HNLITIAPLF AFTVFGSVLY IATRPKPVYL VEYSCYLPPT HCRSSISKVM
DIFYQVRKAD PSRNGTCDDS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMVSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKWW
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKI DSDSGKSETR
VQNGRS

At K92R (SEQ ID NO:36)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPIH LRVSVSKVMD
IFYQIRKADT SSRNVACDDP SSDFLRKIQ ERSGLGDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFENTKVNP REIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNIKSFNLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITQGIYAG ENRSMMSNC LFRVGGAAIL LSNKSGDRRR SKYKLVHTVR
THTGADDKSF RCVQQEDDES GKIGVCLSKD ITNVAGTTLT KNIATLGPLI
LPLSEKFLFF ATFVAKKLLK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDE
LEKNLGLSPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKAW
QIALGSGFKC NSAVWVALRN VKASANSPWQ HCIDRYPVKI DS
DLSKS
KTH VQNGRS

FIGURE 1-6

At254 G307D (SEQ ID NO:38)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSISKVMD
IFYQIRKADT SSRNVACDDP SSLEDFLRKIQ ERSGLGDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFKNTNVNP REIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNIKSFNLLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVN
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKA DSDSGKSET
VQNGRS

At173 G307D (SEQ ID NO:40)

MTSVNVKLLY RYVLTNFFNL CLFPLTAFLA GKASRLTIND LHNFLSYLQH
NLITVTLFA FTVFGLVLYI VTRPNPVYLV DYSCYLPPPH LKVSISKVMD
IFYQIRKADT SSRNVACDDP SSLEDFLRKIQ ERSGLGDETY SPEGLIHVPP
RKTFAASREE TEKVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDV
LEKNLALAPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKVN
QIALGSGFKC NSAVWVALNN VKASTNSPWE HCIDRYPVKA DSDSGKSET
VQNGRS

Bn399 G307D (SEQ ID NO:42)

MTSINVKLLY HYVITNLFNL CFFPLTAIVA GKAYRLTIID LHHLYYSYLQ
HNLITIAPLF AFTVFGSVLY IATRPKPVYL VEYSCYLPPPT HCRSSISKVM
DIFYQVRKAD PSRNCTCDDS SWLDFLRKIQ ERSGLGDETH GPEGLLQVPP
RKTFAAAREE TEQVIIGALE NLFKNTNVNP KDIGILVVNS SMFNPTPSLS
AMVVNTFKLR SNVRSFNLLGG MGCSAGVIAI DLAKDLLHVH KNTYALVVST
ENITYNIYAG DNRSMMSNC LFRVGGAAIL LSNKPGDRRR SKYELVHTVR
THTGADDKSF RCVQQGDDEN GKIGVSLSKD ITDVAGRTVK KNIATLGPLI
LPLSEKLLFF VTFMGKKLFK DKIKHYYVPD FKLAIDHFCI HAGGRAVIDE
LEKNLGLSPI DVEASRSTLH RFGNTSSSI WYELAYIEAK GRMKKGKAW
QIALGSGFKC NSAVWVALRN VKASANSPWQ HCIDRYPVKA DSDLSSKSKTH
VQNGRS

FIGURE 1-7

Arabidopsis thaliana FAE1 (SEQ ID NO:1)

atgacgtccg ttaacgttaa gctcctttac cgttacgtct taaccaactt
tttcaacctc tgttgttcc cgtaacggc gttcctcgcc ggaaaagcct
ctcggcttac cataaacgat ctcccacaact tccttccta tctccaacac
aaccttataa cagtaacttt actctttgt ttcaactgttt tcggtttggt
tctctacatc gtaacccgac ccaatccggg ttatctcggt gactactcg
gttaccttcc accaccgcatt ctc当地 gtaacttccaa agtcatggat
attttctacc aaataagaaa agtgtataact tcttcacggg acgtggcatg
tgatgatccg tcctcgctcg atttcctgag gaagattcaa gagcgttcag
gtcttaggtga tgagacgtac agtcctgagg gactcattca cgttaccaccg
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgctcgaa aatctattcg agaacaccaa agttaaccct agagagattg
gtatacttgt ggtgaactca agcatgttta atccaaactcc ttgcctatcc
gctatggtcg ttaatacttt caagctccga agcaacatca aaagctttaa
tctaggagga atgggttgcgtt gtgtgttgcgtt tattgccatt gattggcta
aagacttgtt gcatgttcat aaaaacactt atgctttgt ggtgagcact
gagaacatca cacaaggcat ttatgctgga gaaaatagat caatgatgg
tagcaattgc ttgtttcgat ttggggggc cgcgatatttgc ctctctaaca
agtcgggaga ccggagacgg tccaagtaca agctagttca cacgggtccga
acgcataactg gagctgtatca caagtctttt cgtatgtgtgc aacaagaaga
cgatgagagc ggcaaaatcg gagttgtct gtcaaaaggac ataaccaatg
ttgcggggac aacacttacg aaaaatatacg caacattggg tccgttgatt
cttcctttaa gcgaaaagtt tcttttttc gctaccttcg tcgccaagaa
acttctaaag gataaaatca agcattacta tggccggat ttcaagcttg
ctgttgacca tttctgtatt catgccggag gcagagccgt gatcgatgag
ctagagaaga acttaggact atcgccgatc gatgtggagg catctagatc
aacgttacat agattggga atacttcatc tagctcaatt tggtatgaat
tagcatacat agaggcaaag ggaagaatga agaaaggaa taaagcttgg
cagattgctt taggatcagg gtttaagtgt aatagtgcgg tttgggtggc
tctacgcaat gtcaaggcat cggcaaatag tccttggcaa cattgcattcg
atagatatcc gttaaaatt gattctgatt tgtcaaagtc aaagactcat
gtccaaaacg gtcggccata atttgatgtt tctgagtgcc aacgttact
ttgtcttcc tttctttat tggttatgaa ttagatgttt actaatgttc
ctctctttt cgttataaaat aaagaagttc aattcttcct atagttcaa
acgcgatttt aagcggttctt attaggttt acatgaattt ctttacaaa
ccatcttt

FIGURE 2-1

Brassica napus elongase KCS (SEQ ID NO:3)

atgacgtcca ttaacgtaaa gtcctttac cattacgtca taaccaacct
tttcaacctt tgcttctttc cgtaacggc gatcgtcgcc ggaaaagcct
atcggtttac catagacgt ctccaccact tatactattc ctatctccaa
cacaacctca taaccatcgc tccactctt gccttcaccc tttcggttc
ggttctctac atcgcaaccc ggcccaaacc ggtttaccc ttgagttact
catgctaccc tccaccaacg cattgttagat caagtatctc caaggtcatg
gatatctttt atcaagtaag aaaagctgat cttctcgga acggcacgtg
cgatgactcg tcgtggcttg acttcttgag gaagattcaa gaacgttcag
gtcttaggcga taaaactcac gggcccggagg ggctgcttca ggtccctccc
cggaagactt ttgcggccgc gcgtgaagag acggagcaag ttatcattgg
tgcgctagaa aatctattca agaacaccaa cgtaaccct aaagatata
gtatacttgt ggtgaactca agcatgttta atccaactcc atcgctctcc
gcgtggctcg ttaacacttt caagctccga agcaacgtaa gaagctttaa
ccttgggtggc atgggttgta gtgcggcgt tatagccatt gatctagcaa
aggactgtt gcatgtccat aaaaatacgt atgctttgt ggtgagcaca
gagaacatca cttataacat ttacgcttgt gataataggt ccatgatgg
ttcaaattgc ttgttccgtg ttgggtgggc cgctattttg ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacgggtcga
acgcataccg gagctgacgg caagtcttt cggtgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgatg
ttgctggctcg aacggtaag aaaaacatag caacgttggg tccgttggatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
acttttcaaa gataaaatca aacattacta cgccccggat ttcaaacttg
ctattgacca ttttgtata catgccggag gcagagccgt gattgatgt
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agattggaa acacttcatc tagctcaata tggatgt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg cttaagtgt aacagtgcag ttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcacgt
acagataccg ggtcaaaatt gattctgatt caggtaaatc agagactcgt
gtccaaaacg gtcggccta ataa

FIGURE 2-2

B. napus elongase KCS (SEQ ID NO:5)

tagagcgtaa cggaccacaa aagaggatcc atacaataac atctcatcg
ttccattact attctccgac acacacactg agcaatgacg tccattaacg
taaagctcct ttaccattac gtcataacca acctttcaa ccttgc
tttccattaa cggcgatcg cgccggaaaa gcctatctt ccata
tcttcaccac ttatactatt cctatcttca acacaacctc ataaccatt
ctccactctt ggccttacc gtttgcgtt cggttctcta catcgcaacc
cgccccaaac cggttacct cgtggagtac tcattgttacc ttccaccaac
gcattgtaga tcaagtatct ccaaggtcat ggatatctt ttccaagtaa
gaaaagctga tccttctcg aacggcacgt gcgatgactc gtcctggctt
gacttcttga ggaagattca agaacgttca ggtctaggcg atgaaaccca
cgggcccggag gggctgcttc aggtccctcc ccggaaagact tttgcgcgc
cgcgtgaaga gacggagcaa gttatcattt gtgcgttaga aaatctatt
aagaacacca atgttaaccc taaagatata ggtatactt tggtaactc
aagcatgttt aatccaactc ctgcgtctc cgcgatggc gttaacactt
tcaagctccg aagcaacgtt aagacttta accttggtgg catgggttg
agtgcggcg ttatagccat tgatcttaga aaggacttgt tgcatgtcca
taaaaatacg tatgctttt tggtgagcac agagaacatc acttataaca
tttacgctgg tgataatagg tccatgttgg ttccaaattt cttgtccgt
gttgggggg ccgctatccc gctctccaaac aagcctagag atcgttagacg
gtccaaagtac gagctagttc acacggttc aacgcataacc ggagctgacg
acaagtctt tcgttgcgtt caacaaggag acgttagagaa cggccaaacc
ggagttagtt tgtccaaagga cataaccat gttgttggc gaacggtaa
gaaaaacata gcaacgctgg gtccgttgc tcttccgtt agcgagaaac
ttctttttt cgttacctt atggcaaga aacttttcaa agacgaaatc
aaacattatt acgtcccgaa cttcaagtt gctatcgacc atttttgtat
acatgccgga ggcaaaagccg tgattgttgc gctagagaag aaccttagggc
tagcaccat cgatgttagt gcatcaagat caacgttaca tagatttgg
aacacttcat ctagctcaat atggtatgag ttggcataca tagaacccaa
aggaaggatg aagaaaggta ataaagtttgc gtagattgttgc ttagggtc
gctttaagtg taacagtgc gtttgggtgg ctctaaacaa tgtcaaagct
tcaacaaata gtccttggaa acactgcattt gacagatacc cggtaaaat
tgattgttgc ttaggttaatg cagagactcg tgtccaaac ggtcggtct
aataaatgtt gtttgcgttcc ttgcgttct ttttatttgtt tataataatt
tgatggccac gatgtttctc ttgtttgttca tgaataaaga atcccacgg
gttcttagtaa aaaaaaaaaa aaaaaaaaaa aaaaaaa

FIGURE 2-3

At114 (SEQ ID NO:7)

atgacgtccg ttaacgttaa gctcctttac cgttatgtct taaccaactt
tttcaacctc tgtttgtcc cgtaacggc gttcctcgcc ggaaaagcct
ctcggtttac cataaacgat ctccacaact tccttccta tctccaacac
aaccttataa cagtaactt actctttgct ttcaactgttt tcggtttgg
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttaccttcc gccaccgcatt ctc当地aaatgtt gtgtctctaa agtcatggat
attttctacc aaataagaaa agtgcataact tcttcacggaa acggcacgtg
tgatgattcg tcgtggcttgc acttcttgag gaagattcaa gaacgttcag
gtctaggcga tgaaactcac gggcccggagg ggctgcttca ggtccctccc
cggaagactt ttgcggccggc gcgtgaagag acggagcaag ttatcattgg
tgc当地tagaa aatctattca agaacaccaa cgtaaccct aaagatata
gtataacttgc ggtgaactca agcatgttt atccaactcc atcgctctcc
gc当地gtcg ttaacactt caagctccga agcaacgtaa gaagctttaa
ccttggggc atgggttgta gtgccggcgt tatagccatt gatctagcaa
aggacttgc gcatgtccat aaaaatacgt atgctcttgc ggtgagcaca
gagaacatca cttataacat ttacgcttgc gataataggt ccatgatgg
ttcaaattgc ttgttccgtt ttggggggc cgctatttttgc ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacgggtcg
acgc当地accg gagctgacgg caagtcttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaggac ataaccgt
ttgctggcgt aacggtaag aaaaacatag caacgttggg tccgttgc
cttccgtttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
actttcaaa gataaaatca aacattacta cgccccggat ttcaaacttgc
ctattgacca ttttgcata catgccggag gcagagccgt gattgatgt
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agattggaa acacttcatc tagctcaata tggtatgagt
tggcatacat agaagcaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaaatag tccttggaa cactgc当地
acagataaccg ggtcaaaattt gattctgatt caggtaagtc agagactcg
gtcccaaaccg gtc当地ccata a

FIGURE 2-4

At74 (SEQ ID NO:9)

atgacgtccg ttaacgttaa gtcctttac cggtacgtct taaccaactt
tttcaacctc tggttgttcc cgtaacggc gttcctcgcc ggaaaagcc
ctcggcttac cataaacatct ctcacaact tcctttccta tctccaacac
aaccttataa cagtaacttt actctttgct ttcaactgttt tcgggttggt
tctctacatc gtaacccgac ccaaaccggc ttacctcggt gagtactcat
gctaccttcc accaacgcattt gtagatcaa gtatctccaa ggtcatggat
atctttatc aagtaagaaa agctgatcct tctcggaaacg gcacgtgcga
tgactcgctg tggcttgact tcttgaggaa gattcaagaa cgttcagggtc
taggcgatga aactcacggg cccgaggggc tgcttcagggt ccctccccgg
aagacttttgcggcggcgc tgaagagacg gagcaagtta tcattgggtc
gctagaaaaat ctattcaaga acaccaacgt taaccctaaa gatataggtt
tacttgggtt gaactcaagc atgtttaatc caactccatc gctctccgc
atggtcgtta acacttcaa gtcgcgaacg aacgtaagaa gctttaacct
tggtggcatg gttgttagtgcggcggttat agccattgtatc tagcaaagg
acttggtgca tgtccataaaa aatacgtatg ctcttgggtt gagcacagag
aacatcaatttataacatttgcgttgcgttgcgttgcgttgcgttgcgttgc
aaattgcttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgc
ctggagatcg tagacggtcc aagtacgagc tagttcacac ggttcgaacg
cataccggag ctgacggcaa gtctttcgatc tgcgtgcaac aaggagacga
tgagaacggc aaaatcgag ttagttgtc caaggacata accgatgttg
ctggtcgaac gtttaagaaa aacatagcaa cgttgggtcc gttgattctt
ccgttaagcg agaaacttct tttttcgatc accttcatgg gcaagaaact
tttcaaaagat aaaatcaaac attactacgt cccggatttc aaacttgcta
ttgaccattt ttgtatacat gccggaggca gagccgtatc tgatgtgcta
gagaagaacc tagccctagc accgatcgat gtagaggcat caagatcaac
gttacataga ttggaaaca cttcatctag ctcaatatgg tatgagttgg
catacataga agcaaaagga aggtgaaga aaggtataaa agtttggcag
attgctttag ggtcaggctt taagtgttac agtgcagttt ggggtggctct
aaacaatgtc aaagcttcga caaatagtc ttggaaacac tgcgtgaca
gataccggc caaaattgtatc tctgatttcag gtaagtcaga gactcggtc
caaaacggc ggtcctaa

FIGURE 2-5

At114 L91C K92R (SEQ ID NO:11)

atgacgtccg ttaacgttaa gtcctttac cggttatgtct taaccaactt
tttcaacctc tggttgtcc cgttaacggc gttcctcgcc ggaaaagcct
ctcggcttac cataaacgat ctccacaaact tcctttccta tctccaacac
aaccttataa cagtaacttt actctttgct ttcaactgttt tcggtttggt
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttaccttcc gccaccgcatt **tgcagaggtt** gtgtctctaa agtcatggat
attttctacc aaataagaaa agctgataact tcttcacgga acggcacgtg
tgataattcg tcgtggcttg acttcttgag gaagattcaa gaacggttca
gtctaggcga tgaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggccgc gcgtgaagag acggagcaag ttatcattgg
tgcgcttagaa aatctattca agaacaccaa cgttaaccct aaagatata
gtataactgtt ggtgaactca agcatgttt atccaactcc atcgctctcc
gcgtatggtcg ttaacacttt caagctccga agcaacgtaa gaagctttaa
ccttgggtggc atgggttgta gtgccggcgt tatagccatt gatctagcaa
aggactgtt gcatgtccat aaaaatacgt atgctcttgtt ggtgagcaca
gagaacatca cttataacat ttacgcttgtt gataataggt ccatgatgg
ttcaaattgc ttgttccgtg ttgggtgggc cgctatTTTt ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacgggtcga
acgcataaccg gagctgacgg caagtcttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaggac ataaccgatg
ttgctggtcg aacggtaag aaaaacatacg caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
acttttcaaa gataaaatca aacattacta cgtccccggat ttcaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gattgatgtg
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttcac tagctcaata tggtatgagt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg cttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaaatag tccttgggaa cactgcatcg
acagataaccc ggtcaaattt gattctgatt caggtaaatc agagactcgt
gtcccaaacg gtcggccta a

FIGURE 2-6

At114 K92R (SEQ ID NO:13)

atgacgtccg ttaacgttaa gtcctttac cggttatgtct taaccaactt
tttcaacctc tggttgttcc cggttaacggc gtcctcgcc ggaaaagcct
ctcggcttac cataaaacgt ctccacaact tcctttccta tctccaacac
aaccttataa cagtaacttt actctttgct ttcaactgttt tcggtttgg
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttaccttcc gccaccgcatt ctcagaggtta gtgtctctaa agtcatggat
attttctacc aaataagaaa agctgataact tttcacgga acggcacgtg
tgatgattcg tcgtggcttg acttcttgag gaagattcaa gaacgttca
gtcttaggcga taaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggccgc gcgtgaagag acggagcaag ttatcattgg
tgcgctagaa aatctattca agaacaccaa cggttaaccct aaagatata
gtataacttgt ggtgaactca agcatgttta atccaaactcc atcgctctcc
gcgtatggcg ttaacacttt caagctccga agcaacgtaa gaagcttta
ccttgggtggc atgggttgta gtgccggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgctttgt ggtgagcaca
gagaacatca ttataacat ttacgcttgt gataataggt ccatgatgtt
ttcaaattgc ttgttccgtg ttgggtgggc cgctatttg ctctccaaca
agcctggaga tcgttagacgg tccaaagtacg agctagttca cacgggtcga
acgcataaccg gagctgacgg caagtcttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgt
ttgctggcg aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
actttcaaa gataaaatca aacattacta cgtcccgat ttcaaacttg
ctattgacca ttttgata catgccggag gcaagccgt gattgatgt
ctagagaaga accttagccct agcaccgatc gatgtagagg catcaagatc
aacgttacat agattggaa acacttcattc tagctcaata tggtatgagt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcattcg
acagataaccc ggtcaaattt gattctgatt caggtaaatc agagactcg
gtccccaaacg gtcgggtccta a

FIGURE 2-7

At114 G307D (SEQ ID NO:15)

atgacgtccg ttaacgttaa gtcctttac cggttatgtct taaccaactt
tttcaacctc tggttgttcc cgtaaacggc gttcctcgcc ggaaaagcct
ctcggttac cataaaacgt ctccacaact tcctttccta tctccaacac
aaccttataa cagtaactt actcttgct ttcaactgtt tcggtttgg
tctctacatc gtaaccgcac ccaatccggt ttatctcggt gactactcg
gttaccttcc gccaccgcat ctcaaagttt gtgtctctaa agtcatggat
atttctacc aaataagaaa agctgataact tttcacgga acggcacgtg
tgatgattcg tcgtggcttg acttcttgag gaagattcaa gaacgttcag
gtctaggcga taaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggcggc gcgtgaagag acggagcaag ttatcattgg
tgcgcttagaa aatctattca agaacaccaa cgtaaccct aaagatata
gtataacttgt ggtgaactca agcatgttta atccaactcc atcgctctcc
gcgatggtcg ttaacactt caagctccga agcaacgtaa gaagctttaa
ccttggtggc atgggtttaa gtgccggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgcttgtt ggtgagcaca
gagaacatca cttataacat ttacgcttgtt gataataggt ccatgatgg
ttcaaattgc ttgttccgtg ttgggtggc cgctatttg ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacggttcga
acgcataccg gagctgacga **caagtcttt** cggtgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaggac ataaccatg
ttgctggtcg aacggtaag aaaaacatag caacgttggg tccgttggatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
actttcaaa gataaaatca aacattacta cgccccggat ttcaaacttg
ctattgacca ttttgtata catgccggag gcagagccgt gattgatgtg
ctagagaaga acctagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttcatc tagctcaata tggtatgagt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg cttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcacatcg
acagataccc ggtcaaaatt gattctgatt caggtaaatc agagactcgt
gtccaaaacg gtcggcccta a

FIGURE 2-8

At 74 G306D (SEQ ID NO:17)

atgacgtccg ttaacgttaa gtcgcattac cgttacgtct taaccaactt
tttcaacctc tggttgttcc cgtaacggc gttcctcgcc ggaaaaggct
ctcggttac cataaacat ctcacaact tcctttcta tctccaacac
aacctataa cagtaacttt actctttgct ttcactgttt tcgggttggt
tctctacatc gtaacccgac ccaaaccggc ttacctcggt gagtaactcat
gctacccccc accaacgcat tgttagatcaa gtatctccaa ggtcatggat
atctttatc aagtaagaaa agctgatcct tctcggAACG gcacgtgcga
tgactcgctg tggcttgact tcttgaggaa gattcaagaa cggtcagggtc
taggcgatga aactcacggg cccgaggggc tgcttcaggt ccctccccgg
aagactttg cggcggcgcg tgaagagacg gagcaagtt tcattggtgc
gctagaaaaat ctattcaaga acaccaacgt taaccctaaa gatataggta
tacttgtggt gaactcaagc atgtttaatc caactccatc gctctcccg
atggtcgtta acactttcaa gtcggaaagc aacgtaagaa gctttAACCT
tggtggcatg ggtttagtg cggcggttat agccattgtat cttagcaaagg
acttgttgca tgtccataaa aatacgtatg ctcttgtggt gagcacagag
aacatcactt ataacattt aactttttcgat aataggcca tgatggttc
aaattgcttg ttccgtgttgcgttgcg tattttgtct tccaacaagg
ctggagatcg tagacggtcc aagtacgagc tagttcacac gggtcgaacg
cataccggag ctgacgacaa gtctttcgat tgctgtcaac aaggagacga
tgagaacggc aaaatcgag tgagttgtc caaggacata accgatgttg
ctggtcgaac ggttaagaaa aacatagcaa cggtgggtcc gttgattctt
ccgttaagcg agaaacttct tttttcgat accttcatgg gcaagaaact
tttcaaaagat aaaatcaaac attactacgt cccggatttc aaacttgcta
ttgaccattt ttgtatacat gccggaggca gagccgtat tgatgtgcta
gagaagaacc tagccctagc accgatcgat gtagaggcat caagatcaac
gttacataga tttggaaaca cttcatctag ctcaatatgg tatgagttgg
catacataga agcaaaaagga aggtgaaga aaggtaataa agtttggcag
attgctttag ggtcaggctt taagtgtac agtgcagttt gggtggctct
aaacaatgtc aaagcttcga caaatagtc ttgggaacac tgcatacgaca
gatacccggt caaaaattgtat tctgattcag gtaagtcaga gactcggtc
caaaaacqgtc ggtcctaa

FIGURE 2-9

At114 L91C K92R G307D (SEQ ID NO:19)

atgacgtccg ttaacgttaa gtcctttac cgttatgtct taaccaactt
tttcaacctc tgtttgtcc cgttaacggc gttcctcgcc ggaaaagcct
ctcggcttac cataaacat cttccacaact tcctttccta tctccaacac
aaccttataa cagtaactt actctttgct ttcaactgttt tcggtttggt
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttaccttcc gccaccgcatt **tgca**gaggtta gtgtctctaa agtcatggat
atttcttacc aaataagaaa agctgataact tcttcacgga acggcacgtg
tgataattcg tcgtggcttg acttcttgag gaagattcaa gaacgttca
gtcttaggcga tgaaactcac gggcccggagg ggctgcttca ggtccctccc
cggaagactt ttgcggcggc gcgtgaagag acggagcaag ttatcattgg
tgcgctagaa aatcttatca agaacaccaa cgttaaccct aaagatata
gtataacttgt ggtgaactca agcatgttt atccaactcc atcgctctcc
gcgatggtcg ttaacactt caagctccga agcaacgtaa gaagctttaa
ccttgggtggc atgggtttaa gtgcggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgcttttgt ggtgagcaca
gagaacatca cttataacat ttacgcttgt gataataggt ccatgatgg
ttcaaattgc ttgttccgtg ttgggtgggc cgctattttg ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacggttcga
acgcataaccg gagctgacga **ca**agtcttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaggac ataaccgatg
ttgctgtcg aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
actttcaaa gataaaatca aacattacta cgtcccgat ttcaaacttg
ctattgacca ttttgtata catgccggag gcagagccgt gattgatgt
ctagagaaga acctagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agattggaa acacttcatc tagctcaata tggtatgagt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcac
acagataccc ggtcaaaatt gattctgatt caggtaaatc agagactcg
gtccaaaacg gtcggtccta a

FIGURE 2-10

At114 K92R G307D (SEQ ID NO:21)

atgacgtccg ttaacgttaa gctcctttac cggttatgtct taaccaactt
tttcaacctc tggttgttcc cgttaacggc gtccctcgcc ggaaaagcct
ctcggcttac cataaacatc ctccacaact tcctttccta tctccaacac
aaccttataa cagtaacttt actctttgtt ttactgtt tcgggttggt
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttaccttcc gccaccgcatt ctcagaggtt gtgtctctaa agtcatggat
attttcttacc aaataagaaa agtgcataact tcttcacgga acggcacgtg
tgatgattcg tcgtggcttg acttctttagt gaagattcaa gaacgttcag
gtctaggcga tgaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggcggt gcgtgaagag acggagcaag ttatcattgg
tgcgctagaa aatctatca agaacaccaa cgttaaccct aaagatata
gtataactgt ggtgaactca agcatgttta atccaaactcc atcgctctcc
gcgtatgtcg ttaacactt caagctccga agcaacgtaa gaagctttaa
ccttgggtggc atgggttgcgt tgcggccgt tatagccatt gatctagcaa
aggacttgcgtt gcatgtccat aaaaatacgt atgctcttgcgtt ggtgagcaca
gagaacatca cttataacat ttacgcttgcgt gataataggt ccatgtatgg
ttcaaattgc ttgttccgtt ttgggtgggc cgctatttttgcgtt ctctccaaca
agcctggaga tcgttagacgg tccaaagtacg agctagttca cacgggtcga
acgcataaccg gagctgacga **caagtctttc** cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgatg
ttgctgtcg aacggtaag aaaaacatag caacgttggg tccgttgcgtt
cttccgtttaa gcgagaaact tcttttttc gtaccttca tggcaagaa
acttttcaaa gataaaatca aacattacta cgtccccgtt ttcaaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gattgtatgt
ctagagaaga acctagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttcatc tagctcaata tggatgt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagtttgg
cagattgcgtt tagggtcagg cttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttgggaa cactgcac
acagataaccc ggtcaaaattt gattctgatt caggtaaatc agagactcg
gtccaaaacg gtcgggtccta a

FIGURE 2-11

At254 (SEQ ID NO:23)

atgacgtccg ttaacgttaa gctcctttac cgttacgtct taaccaactt
tttcaacctc tgtttgttcc cgttaacggc gttcctcgcc ggaaaagcct
ctcggcttac cataaacgat ctccacaacc tccttccta tctccaacac
aaccttataa cagtaacttt actctttgtt ttcaactgtt tcggtttgtt
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttaccttcc accacccgcat ctcaaaggta gtgtctctaa agtcatggat
attttctacc aaataagaaaa agctgatact tcttcacgga acgtggcatg
tgatgatccg tcctcgctcg atttcctgag gaagattcaa gagcgttcag
gtcttaggtga tgagacgtac agtcctgagg gactcattca cgtaccaccc
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgctcgaa aatctattcg agaacaccaa agttaaccct agagagattg
gtataacttgt ggtgaactca agcatgttta atccaactcc ttgcgtatcc
gctatggctcg ttaataacttt caagctccga agcaacatca aaagctttaa
tctaggagga atgggttgta gtgctgggtt tattgccatt gatttggcta
aagacttgtt gcatgttcat aaaaacactt atgctctcggt ggtgagcaca
gagaacatca cttataacat ttacgctgggt gataaataggt ccatgatgt
ttcaaattgc ttgttccgtg ttggggggc cgctattttg ctctccaaca
agcctggaga tcgtagacgg tccaagtacg agctagttca cacgggtcga
acgcataccg gagctgacgg caagtcttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtggatggt gtccaaaggac ataaccgatg
ttgctggctcg aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
actttcaaa gataaaatca aacattacta cgtcccggat ttcaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gattgatgtg
ctagagaaga acctagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttccatc tagctcaata tggtatgatg
tggcatacat agaagcaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcacatcg
acagataccc ggtcaaaatt gattctgatt caggtaaagtc agagactcg
gtccccaaacg gtcggccata a

FIGURE 2-12

At173 (SEQ ID NO:25)

atgacgtccg ttaacgttaa gtcctttac cggttacgtct taacccaactt
tttcaacctc tggttggcc cgttaacggc gttcctcgcc ggaaaagcct
ctcggttac cataaacat cttccacaact tcctttccta tctccaacac
aacctataa cagtaacttt actcttgct ttcaactgttt tcgggttttgt
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttacccccc accaccgcattt ctcaaaggta gtgtctctaa agtcatggat
attttctacc aaataagaaa agtctgataact tcttcacggaa acgtggcatg
tgatgatccg tcctcgctcg atttccttagt gaagattcaa gagcgttcag
gtcttaggtga tgagacgtac agtcctgagg gactcattca cgtaccaccg
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgctcgaa aatctattca agaacaccaa cggttaacccct aaagatata
gtataacttgt ggtgaactca agcatgttta atccaaactcc atcgctctcc
gcatgggtcg ttaacacttt caagctccga agcaacgtaa gaagctttaa
ccttgggtggc atgggttgta gtggccggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgctcttgtt ggtgagcaca
gagaacatca cttataacat ttacgcttgtt gataataggt ccatgatgg
ttcaattgc ttgttccgtg ttgggtgggc cgcttatttttgc ctctccaaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacgggttcga
acgcataccg gagctgacgg caagtctttt cggtgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgatg
ttgctgggtcg aacggtaaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tgggcaagaa
acttttcaaa gataaaatca aacattacta cgtccccggat ttcaaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gattgatgtg
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatggaa acacttcatc tagctcaata tggatgt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagtttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag ttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcac
acagataccg ggtcaaaattt gattctgatt caggtaaatc agagactcg
gtccaaaacg gtcggccata a

FIGURE 2-13

Bn176 (SEQ ID NO:27)

atgacgtcca ttaacgtaaa gctccttac cattacgtca taaccaaact
tttcaacctt tgcttcttc cgtaacggc gatcgctgcc ggaaaagcct
atcggttac catagacgt ctccaccact tatactattc ctatctccaa
cacaacctca taaccatcgc tccactctt gccttcacccg tttcggttc
ggttctctac atcgcaacccc ggcccaaacc gtttacccctc gttagtact
catgctaccc tccaccaacg cattgttagat caagtatctc caaggtcatg
gatatcttt atcaagaatggaaaagctgat ccttctcgga acggcacgtg
cgatgactcg tcgtggcttg acttctttagt gaagattcaa gaacgttcag
gtctaggcga tgaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggcggc gcgtgaagag acggagcaag ttatcattgg
tgcgcttagaa aatctattca agaacaccaa agttaacccct agagagattg
gtatacttgt ggtgaactca agcatgttta atccaaactcc ttcgctatcc
gctatggtcg ttaatacttt caagctccga agcaacatca aaagctttaa
tcttaggagga atgggttgc gtgctgggt tattgccatt gatttggcta
aagacttgtt gcatgttcat aaaaacactt atgctctgt ggtgagcact
gagaacatca cacaaggcat ttatgctgga aaaaatagat caatgatgg
tagcaattgc ttgtttcgtg ttggggggc cgcgatttg ctctctaaca
agtcgggaga ccggagacgg tccaagtaca agctagttca cacggcccg
acgcatactg gagctgatga caagtcttt cgatgtgtgc aacaagaaga
tgtatgagagc ggcaaaatcg gagttgtct gtcaaaggac ataaccaatg
ttgcggggac aacacttacg aaaaatata caacattgg tccgttgatt
cttcctttaa gcgaaaagtt tcttttttc gctacctcg tcgccaagaa
acttctaaag gataaaatca agcattacta tgttccggat ttcaagcttg
ctgttacca tttctgtatt catgccccgg gcagagccgt gatcgatgag
ctagagaaga acttaggact atcgccgatc gatgtggagg catctagatc
aacgttacat agatttggga atacttcatc tagctcaatt tgttatgaat
tagcatacat agaggcaaag ggaagaatga agaaaggaa taaagcttgg
cagattgctt taggatcagg gtttaagtgt aatagtgcgg tttgggtggc
tctacgcaat gtcaaggcat cggcaaatag tccttggcaa cattgcacatcg
atagatatcc ggttaaaatt gattctgatt tgtcaaagtc aaagactcat
gtccaaaacg gtcggtccta a

FIGURE 2-14

At399 (SEQ ID NO:29)

atgacgtccg ttaacgttaa gctcctttac cgttacgtct taaccaactt
tttcaacctc tgtttggccc cgttaacggc gttcctcgcc ggaaaagcct
ctcggttac cataaaacgat ctccacaact tcctttccta tctccaacac
aaccttataa cagtaacttt actcttgct ttcaactgttt tcggtttgg
tctctacatc gtaaccggac ccaatccggt ttatctcggt gactactcg
gttacccccc accaccgcat ctcaaaggta gtgtctctaa agtcatggat
attttctacc aaataagaaa agctgataact tcttcacggg acgtggcatg
tgatgatccg tcctcgctcg atttcctgag gaagattcaa gagcggttcag
gtcttaggtga tgagacgtac agtcctgagg gactcattca cgtaccaccg
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgctcgaa aatctattcg agaacaccaa agttaaccct agagagattg
gtatacttgt ggtgaactca agcatgttta atccaactcc ttgcgtatcc
gctatggtcg ttaatacttt caagctccga agcaacatca aaagctttaa
tcttaggagga atgggttgta gtgctgggtgt tattgccatt gatttggcta
aagacttgtt gcatgttcat aaaaacactt atgctcttgt ggtgagcact
gagaacatca cacaaggcat ttatgctgga gaaaatagat caatgatgg
tagcaattgc ttgtttcggt tggtggggc cgcgatttg ctctctaaca
agtcgggaga ccggagacgg tccaagtaca agctagttca cacggccga
acgcatactg gagctgatga caagtcttt cgatgtgtgc aacaagaaga
cgatgagagc ggcaaaatcg gagttgtct gtcaaaggac ataaccaatg
ttgcggggac aacacttacg aaaaatatag caacattggg tccggttgatt
cttcctttaa gcgaaaagtt tcttttttc gctacctcg tcgccaagaa
acttctaaag gataaaatca agcattacta tggtccggat ttcaagcttg
ctgttgacca tttctgtatt catgccggag gcagagccgt gatcgatgtg
ctagagaaga acctagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttcatc tagctcaata tggtatgagt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg cttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttgggaa cactgcac
acagataccc ggtcaaaatt gattctgatt caggtaaagtc agagactcg
gtccaaaacg gtcggccata a

FIGURE 2-15

Bn399 (SEQ ID NO:31)

atgacgtcca ttaacgttaa gtcctttac cattacgtca taaccaacctt
tttcaacctt tgcttcttc cgtaacggc gatcgccgc ggaaaagcct
atcggcttac catagacgt cttcaccact tatactattc ctatctccaa
cacaacctca taaccatcgc tccactctt gccttcacccg ttttcggttc
ggttctctac atcgcaaccc ggcccaaacc ggtttaccc gttgagtact
catgctaccc tccaccaacg cattgttagat caagtatctc caaggtcatg
gatatctttt atcaagtaag aaaagctgat cttctcgga acggcacgtg
cgatgactcg tcgtggctt acttcttgag gaagattcaa gaacgttcag
gtctaggcga tgaaactcac gggcccggagg ggctgcttca ggtccctccc
cggaagactt ttgcggcggc gcgtgaagag acggagcaag ttatcattgg
tgcgctagaa aatctattca agaacaccaa cgtaaccct aaagatatacg
gtatacttgt ggtgaactca agcatgttta atccaactcc atcgctctcc
gcgatggtcg ttaacacttt caagctccga agcaacgtaa gaagctttaa
ccttgggtggc atgggtgtt gtgccggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgctcttgt ggtgagcaca
gagaacatca cttataacat ttacgcttgc gataataggt ccatgatgg
ttcaaattgc ttgttccgtt ttgggtgggc cgctattttg ctctccaaca
agcctggaga tcgttagacgg tccaagtagc agcttagttca cacgggtcg
acgcataccg gagctgacgg caagtctttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgatg
ttgctggtcg aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
acttttcaaa gataaaatca aacattacta cgtcccgat ttcaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gatcgatgag
ctagagaaga acttaggact atcgccgatc gatgtggagg catctagatc
aacgttacat agatttggga atacttcatc tagctcaatt tgttatgaat
tagcatacat agaggcaaag ggaagaatga agaaaggaa taaagcttgg
cagattgctt taggatcagg gtttaagtgt aatagtgcgg tttgggtggc
tctacgcaat gtcaaggcat cgccaaatag tccttggcaa cattgcacgt
atagatatcc ggtaaaatt gattctgatt tgtcaaagtc aaagactcat
gtccaaaacg gtcggtccta a

FIGURE 2-16

Bn G307D (SEQ ID NO:33)

atgacgtcca ttaacgtaaa gtcctttac cattacgtca taaccaacct
tttcaacctt tgcttcttc cgtaacggc gatcgccgc ggaaaagcct
atcggcttac catagacgt cttcaccact tatactattc ctatctccaa
cacaacctca taaccatcgc tccactctt gccttcacccg tttcggttc
ggttctctac atcgcaaccc ggcccuaacc ggttacccg gttgagtact
catgctaccc tccaccaacg cattgttagat caagtatctc caaggtcatg
gatatcttt atcaagtaag aaaagctgat cttctcgga acggcacgtg
cgatgactcg tcgtggcttg acttcttgag gaagattcaa gaacgttcag
gtctaggcga tgaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggcgcc gctgaaagag acggagcaag ttatcattgg
tgcgctagaa aatctattca agaacaccaa cgtaaccct aaagatata
gtatacttgt ggtgaactca agcatgttta atccaaactcc atcgctctcc
gcgtggctcg ttaacacttt caagctccga agcaacgtaa gaagcttta
ccttggtggc atgggttgc gtgcggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgctcttgt ggtgagcac
gagaacatca cttataacat ttacgcttgt gataataagg ccgtatgg
ttcaaaattgc ttgttccgtg ttgggtggc cgctattttg ctctccaaca
agcctggaga tcgtagacgg tccaagtagc agctagttca cacggttcga
acgcataccg gagctgacga caagtcttt cggtgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgatg
ttgctggctcg aacggtaag aaaaacatag caacgttggg tccggtgatt
cttccgttaa gcgagaaaact tcttttttc gttacctca tggcaagaa
actttcaaa gataaaatca aacattacta cgtcccgat ttcaaacttg
ctattgacca ttttgtata catgccggag gcagagccgt gattgatgtg
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttcatc tagctcaata tggtatgagt
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag tttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcac
acagataccc ggtcaaaatt gattctgatt caggtaaatc agagactcgt
gtccaaaacg gtcggcccta ataa

FIGURE 2-17

At K92R (SEQ ID NO:35)

atgacgtccg ttaacgttaa gtcctttac cgttacgtct taaccaactt
tttcaacctc tgtttgtcc cgttaacggc gttcctcgcc ggaaaagcct
ctcggttac cataaacat ctcacaact tccttccta tctccaacac
aaccttataa cagtaacttt actcttgct ttcaactgttt tcggtttgg
tctctacatc gtaaccgcac ccaatccgtt ttatctcggt gactactcg
gttacottcc accaccgcattc ctcagaggta gtgtctctaa agtcatggat
attttctacc aaataagaaa agtctgatact tcttcacgga acgtggcatg
tgcgtatccg tcctcgctcg atttcctgag gaagattcaa gagcgttcag
gtcttaggtga tgagacgtac agtcctgagg gactcattca cgtaccaccc
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgtcgaa aatctattcg agaacaccaa agttaaccct agagagattg
gtataacttgt ggtgaactca agcatgtttt atccaactcc ttgcgttatcc
gctatggtcg ttaatacttt caagctccga agcaacatca aaagctttaa
tctaggagga atgggttgta gtgctgggtt tattgccatt gatttggcta
aagacttgtt gcatgttcat aaaaacactt atgctttgtt ggtgagcact
gagaacatca cacaaggcat ttatgctgga gaaaatagat caatgatgg
tagcaattgc ttgtttcggtt tggtggggc cgcgatttg ctctctaaca
agtcgggaga ccggagacgg tccaagtaca agctagttca cacggtccga
acgcataactg gagctgatga caagtctttt cgatgtgtgc aacaagaaga
cgatgagagc ggcaaatcg gagttgtct gtcaaaggac ataaccaatg
ttgcggggac aacacttacg aaaaatatacg caacattggg tccgttgatt
cttcctttaa gcggaaatgtt tcttttttc gctacctcg tcgccaagaa
acttctaaag gataaaatca agcattacta tggccggat ttcaagctg
ctgttgacca tttctgtatt catgccggag gcagagccgt gatcgatgag
ctagagaaga acttagact atcgccgatc gatgtggagg catctagatc
aacgttacat agatttggga atacttcatc tagctcaatt tggtatgaat
tagcatacat agaggcaaag ggaagaatga agaaaggaa taaagcttg
cagattgctt taggatcagg gtttaagtgt aatagtgcgg tttgggtggc
tctacgcaat gtcaaggcat cggcaaatag tccttggcaa cattgcacatcg
atagatatcc gttaaaattt gattctgatt tgtcaaagtc aaagactcat
gtccaaaacg gtcggccata atttgatgtt tctgagtgcc aacgtttact
ttgtctttcc tttctttat tggttatgaa ttagatgttt actaatgttc
ctctctttt cgttataaaat aaagaaggaa aattcttcct atagttcaa
acgcgatttt aagcgtttctt attaggttt acatgaattt cttttacaaa
ccatctttt

FIGURE 2-18

At254 G307D (SEQ ID NO:37)

atgacgtccg ttaacgttaa gtcctttac cgttacgtct taaccaactt
tttcaacctc tgtttgtcc cgttaacggc gttcctcgcc ggaaaagcct
ctcggttac cataaacat ctccacaact tccttccta tctccaacac
aaccttataa cagtaactt actcttgct ttcaactgtt tcggtttgg
tctctacatc gtaaccgcac ccaatccggt ttatctcggt gactactcg
gttaccttcc accaccgcac ctcaaagtta gtgtctctaa agtcatggat
attttctacc aaataagaaa agctgatact tcttcacgga acgtggcatg
tgatgatccg tcctcgctcg atttcctgag gaagattcaa gagcgttcag
gtctaggta tgagacgtac agtcctgagg gactcattca cgtaccaccg
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgctcgaa aatctattcg agaacaccaa agttaaccct agagagattg
gtatacttgt ggtgaactca agcatgttta atccaaactcc ttgcgttatcc
gctatggtcg ttaatacttt caagctccga agcaacatca aaagctttaa
tctaggagga atgggtgtt gtcgtgggt tattgccatt gatttggcta
aagacttgtt gcatgttcat aaaaacactt atgctctcg ggtgagcaca
gagaacatca cttataacat ttacgctggt gataataggt ccatgatggt
ttcaaattgc ttgttccgtg ttgggtgggc cgcttatttg ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agctagttca cacgggtcga
acgcataccg gagctgacga caagtcttt cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgatg
ttgctggtcg aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tgggcaagaa
acttttcaaa gataaaatca aacattacta cgtcccggat ttcaaacttg
ctattgacca ttttgtata catgccggag gcagagccgt gattgatgtg
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttggaa acacttcatc tagctcaata tggtatgatg
tggcatacat agaagaaaa ggaaggatga agaaaggtaa taaagtttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag ttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttggaa cactgcacg
acagataccc ggtcaaaatt gattctgatt caggtaaatc agagactcg
gtccaaaacg gtcgggtccta a

FIGURE 2-19

At173 G307D (SEQ ID NO:39)

atgacgtccg ttaacgttaa gctcctttac cgttacgtct taaccaactt
tttcaacctc tggttggtcc cgtaacggc gttcctcgcc ggaaaagcct
ctcggttac cataaaacgt ctccacaact tccttccta tctccaacac
aaccttataa cagtaacttt actcttgct ttcaactgttt tcggtttgg
tctctacatc gtaacccgac ccaatccggt ttatctcggt gactactcg
gttacccccc accaccgcattt ctc当地ggta gtgtctctaa agtcatggat
attttctacc aaataagaaa agctgataact ttccacggg acgtggcatg
tgatgatccg tcctcgctcg atttcctgag gaagattcaa gagcgttcag
gtctaggta tgagacgtac agtcctgagg gactcattca cgtaccaccg
cggaagactt ttgcagcgtc acgtgaagag acagagaagg ttatcatcg
tgcgctcgaa aatctattca agaacaccaa cgtaaccct aaagatata
gtatacttgt ggtgaactca agcatgtttt atccaaactcc atcgctctcc
gcgtatggtcg ttaacacttt caagctccga agcaacgtaa gaagctttaa
ccttggtggc atgggttgcgatggccgt tatagccatt gatctagcaa
aggacttgcgatggccat aaaaatacgt atgctcttgt ggtgagcaca
gagaacatca cttataacat ttacgctggt gataataggt ccatgatgg
ttcaaattgc ttgttccgtg ttgtggggc cgctattttg ctctccaaaca
agcctggaga tcgttagacgg tccaaatgc agctagtca cacgggtcga
acgcataccg gagctgacga **caagtcttt** cggtcgatgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaaaggac ataaccgt
ttgttgcgatggccat aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaaact tcttttttc gttaccttca tgggcaagaa
actttcaaa gataaaatca aacattacta cgtcccgat ttcaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gattgtatgt
ctagagaaga accttagccct agcaccgatc gatgttagagg catcaagatc
aacgttacat agatttgaa acacttcattc tagctcaata tggtatgat
tggcatacat agaagcaaaa ggaaggatga agaaaggtaa taaagttgg
cagattgctt tagggtcagg ctttaagtgt aacagtgcag ttgggtggc
tctaaacaat gtcaaagctt cgacaaatag tccttgggaa cactgcattc
acagataccc ggtcaaaattt gattctgatt caggtaaatc agagactcg
gtccaaaacg gtcggcata a

FIGURE 2-20

Bn399 G307D (SEQ ID NO:41)

atgacgtcca ttaacgttaa gtcctttac cattacgtca taaccaacct
tttcaacctt tgcttcttc cgtaacggc gatcgctgcc ggaaaagcct
atcggttac catagacgt ctccaccact tatactattc ctatctccaa
cacaacctca taaccatcgc tccactctt gccttcacccg tttcggttc
ggttctctac atcgcaaccc ggcccaaacc ggtttaccc gttgagttact
catgctaccc tccaccaacg cattgttagat caagtatctc caaggtcatg
gatatcttt atcaagtaag aaaagctgat cttctcgga acggcacgtg
cgatgactcg tcgtggctt acttcttgag gaagattcaa gaacgttcag
gtctaggcga tgaaactcac gggcccgagg ggctgcttca ggtccctccc
cggaagactt ttgcggcggc gcgtgaagag acggagcaag ttatcattgg
tgcgctagaa aatctattca agaacaccaa cgtaaccct aaagatata
gtatacttgt ggtgaactca agcatgttta atccaactcc atcgctctcc
gcgatggtcg ttaacacttt caagctccga agcaacgtaa gaagctttaa
ccttggtggc atgggttgta gtgcggcgt tatagccatt gatctagcaa
aggacttgtt gcatgtccat aaaaatacgt atgctcttgt ggtgagcaca
gagaacatca cttataacat ttacgcttgt gataataggt ccatgatggt
ttcaaattgc ttgttccgtg ttggggggc cgctattttg ctctccaaca
agcctggaga tcgttagacgg tccaagtacg agcttagttca cacgggtcga
acgcataccg gagctgacga **caagtcttt** cgttgcgtgc aacaaggaga
cgatgagaac ggcaaaatcg gagtgagttt gtccaggac ataaccgatg
ttgctggtcg aacggtaag aaaaacatag caacgttggg tccgttgatt
cttccgttaa gcgagaaact tcttttttc gttaccttca tggcaagaa
acttttcaaa gataaaatca aacattacta cgtccggat ttcaaacttg
ctattgacca tttttgtata catgccggag gcagagccgt gatcgatgag
ctagagaaga acttaggact atcgccgatc gatgtggagg catctagatc
aacgttacat agatttggga atacttcatc tagctcaatt tggtatgaat
tagcatacat agaggcaaag ggaagaatga agaaaggaa taaagcttgg
cagattgctt taggatcagg gtttaagtgt aatagtgcgg tttgggtgac
tctacgcaat gtcaaggcat cggcaaatacg tccttggcaa cattgcacgt
atagatatcc gttaaaatt gattctgatt tgtcaaagtc aaagactcat
gtccaaaacg gtcggccta a

FIGURE 2-21